

Development of Water Quality Indices: A Set of Qualitative and Quantitative Indicators

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Public Comments

No public comments were received for this proposal.

Technical Synthesis Panel Review

Proposal Title

#0305: Development of Water Quality Indices: A Set of Qualitative and Quantitative Indicators

Final Panel Rating
inadequate

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

The water quality indicator tool will be developed in this project. The proposal did not review existing indices nor compared them with the WQI, so that there is no indication why the new one would be advantageous to ones developed earlier. A critique of previous indices, their strength and shortcomings, would have set a critical stage for the need to develop new, robust indices. The literature review should have been part of the proposal (building on the expertise of the proposal authors), so that it would be clear how this project would build on prior experiences. To quote an external reviewer: "We are simply told literature will be reviewed, experts will be assembled, and an index will be developed". No information is provided on what the WQI will look like. How would the approach for drinking water quality differ from that used for ecosystem water quality? How will the tools be tested and what will be the benchmark for success or validation? While the proposal mentions "tests runs" of the WQI at different stages of development, it remains unclear how it will be tested and validated. The assessment tool will only be developed in this project; implementation would require a second cycle of funding. The budget is very high for a project like this for which costs are mainly labor and some travel. A \$100,000 literature review should not be needed as the proposers are

#0305: Development of Water Quality Indices: A Set of Qualitative and Quanti...

expected to know the existing literature.

Additional Comments:

EXTERNAL REVIEW summary: The external reviews ranged from "POOR" to "GOOD". While the overall goals were clear, the detailed objectives remained vague "what will the WQI look like, how will it be applied, and what will be the ultimate target?". The justification was felt to be weak. While such indices are important, it was left unclear what the shortcomings of consisting indices are and how the current project will improve on those. The approach was well described in terms of the steps taken in the project, but the approach on shaping the WQI (what form will the WQI take on?) is unclear and not fully documented. It is possible that the index may end up being similar to currently existing indices. The development of the WQI was felt to be technically feasible. With respect to the creation of valuable products; the developed WQI may be valuable. But value would be dependent on a future implementation of the WQI. And no new data would be generated. With respect to capabilities, the external reviewers felt that the investigators, together with the advisory board, are very well qualified to implement the project. The budget was felt to be excessive. Hourly rates were very high. In general, the cost/benefit ratio was considered to be suboptimal. Overall, the external reviewers felt that the proposal was not well developed (it is unclear what the index will look like, and too much of the development was left to be worked out once funded). Addition to the scientific knowledge base was considered to be limited.

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Technical Synthesis Panel Review

build on prior experiences. To quote an external reviewer: "We are simply told literature will be reviewed, experts will be assembled, and an index will be developed". No information is provided on what the WQI will look like. How would the approach for drinking water quality differ from that used for ecosystem water quality? How will the tools be tested and what will be the benchmark for success or validation? While the proposal mentions "tests runs" of the WQI at different stages of development, it remains unclear how it will be tested and validated. The assessment tool will only be developed in this project; implementation would require a second cycle of funding. The budget is very high for a project like this for which costs are mainly labor and some travel. A \$100,000 literature review should not be needed as the proposers are expected to know the existing literature.

Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

Development of water quality indices: a set of qualitative and quantitative indicators

The proposal contains little information on what will be done or developed and project details are vague. It does not adequately describe how the WQI compares to other indices and how it builds on these. The budget is high. The project would provide a very limited addition to our scientific knowledge base.

Final Ranking: Inadequate

Technical Review #1

proposal title: Development of Water Quality Indices: A Set of Qualitative and Quantitative Indicators

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	<p>Currently, water quality impairment (and, therefore, improvement) is measured in diverse and often conflicting ways, both qualitatively and quantitatively. The authors propose to develop an assessment tool, a system of Water Quality Indices (WQI), by which water quality may be evaluated.</p> <p>The idea is timely and important. The goals of an overall endeavor are clearly stated and internally consistent. But the objectives are vague. What will these WQI look like and how will they be applied? I don't get a concrete sense of objective. Even if objectives need to be scoped, the authors should describe a clearly defined target. Also, the authors should emphasize that this is "Part I. Developement." Actual implementation, a key component of success, does not appear to be included in this proposal.</p> <p>This is an exploratory study, so no one knows what the recommendations will be, but the proposal seems too vague on what the results might actually look like. This sounds like an expert system, but how will it be implemented? What is the author's vision for this framework?</p>
Rating	good

Technical Review #1

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

	Yes, the study is justified. There is a definite need for a clear and consistent approach to evaluating water quality with respect to regulatory goals and all of water quality's multiple effects on beneficial uses.
Comments	The model for development of this concept (i.e. detailed literature reviews and discussion with a broad range of scientists, regulators, and stakeholders) seems sound. But I believe that the project should be less focused on literature and discussion and more oriented towards producing a successful implementation (on, perhaps, smaller scale).
Rating	good

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	<p>If successful, the information would be useful to decision makers. But I worry about the approach. The proposed approach includes a lot of (expensive) meetings and results in a tested, but not implemented, product. The authors will undoubtedly produce something meaningful on conclusion of the project, but this will only represent development of the system. To be successful, an expert system like this must be implemented and iterated upon.</p> <p>A comprehensive expert system like the one proposed,</p>
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Technical Review #1

	<p>if it is fully developed before a prototype is implemented and tested by decision-makers, could end up being out-of-touch and of limited real use.</p> <p>I'd be more comfortable with a project more limited in scope that is taken through implementation. The sytem should be completely tested in the hands of decision-makers and evaluated. At that point, the authors could come back with another proposal to broaden the scope based on a successful prototype.</p> <p>Even if useful products are developed, the products proposed by this project are of limited value until the proponents are given another grant to implement.</p>
Rating	good

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	<p>For the scope of the project, and with the identified deliverables, the approach seems feasible. But it is hard to tell. Actual development of the WQI and the framework envisioned could be better described. Again, I think success is more likely in smaller steps. I do think that the authors understand the scale of the project. The project, should be described as "Part I. Development" to be consistent with its objectives.</p>
Rating	good

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Technical Review #1

Comments	No monitoring proposed.
Rating	not applicable

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	There will be no interpretive or interpretable outcomes from this project. The project is considered within the scope of larger data management systems. It appears that the products will be of limited value unless the proponents are provided with a future grant to complete implementation.
Rating	good

Additional Comments

Comments	The proponents seem well prepared to tackle this important task. In fact, there may be some redundancy in expertise. Done well, the product could be very useful. But I worry about getting yet another overblown "comprehensive" expert system or analysis tool (like EPA's BASINS). A system of smaller, intuitively connected, analysis tools is much more comfortable to a diversity of managers and scientists.
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The team seems very well qualified to tackle this job and they appear to have the experience and infrastructure to carry the project to completion. but I'm surprised that the proposal doesn't seem more clear and
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Technical Review #1

	focused.
Rating	very good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	<p>The budget seems excessive. Perhaps it is because of the heavy use of higher-level consultants. Also, over \$100k is allocated for literature review tasks. Literature is something that experienced researchers with several related projects should bring with them to a proposal. Conducting meetings is expensive.</p> <p>As suggested above, I'd rather see a leaner team bring an idea to implementation using a few good experts. Then, bring in more experts to evaluate the product and suggest changes before developing a final product on a smaller scale.</p>
Rating	fair

Overall

Provide a brief explanation of your summary rating.

Comments	<p>The goals of this project are good and certainly address a need in the water quality community. The approach may work out well providing that the proponents get additional funds to implement the product they develop. But the objectives and approach are too vague for a project of this scope. The objectives should be clearer and the approach could be improved by re-organizing priorities and focusing on development and implementation of WQIs for one component of water quality assessment. After that, the</p>
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Technical Review #1

	entire and comprehensive nature of assessment could be more clearly addressed.
Rating	good

Technical Review #2

proposal title: Development of Water Quality Indices: A Set of Qualitative and Quantitative Indicators

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The goals of this project are clearly stated. There is no hypothesis to be tested at all. The idea of developing a WQI is important relative to the priority topic area of performance assessment tools.
Rating	very good

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	A real weakness of this proposal is that there is no conceptual model at all. Certainly, water quality indices have been developed previously. What are the principles that underlie existing indices? How have they been used? What are the advantages and disadvantages of existing indices? How will the proposed index differ from existing indices? What will the investigators do to eliminate the shortcomings of existing indices?
Rating	good

Technical Review #2

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	<p>This proposal can be summarized in one sentence: "We will gather a group of experts and create a water quality index." The rest is painful detail on meetings and deliverables. It appears that a lot of work has gone into this proposal but not a lot of thought. As noted under the "Justification" heading, this proposal suffers from lack of review of existing approaches and from lack of a proposed approach. No idea is provided as to what the form of the WQI might be. Consequently, the reviewer cannot judge if the results will be novel or add to the base of knowledge. Based on the material provided, the product might be similar or identical to an index that already exists. Despite these shortcomings, the product will likely be useful to managers.</p>
Rating	good

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	<p>The approach is not fully documented. We are simply told literature will be reviewed, experts will be assembled, and an index will be developed. Development of an index is technically feasible and, given the level of expertise that has been assembled, there is a strong likelihood that a suitable index will be produced.</p>
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Technical Review #2

Rating	very good
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Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	No monitoring is proposed as part of this project. This proposal would benefit from a brief review of existing monitoring data and its availability/relevance to a WQI.
Rating	fair

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	A valuable WQI is likely to result from this project. The test runs of the index and the production of a user's guide will assist in the integration of the index into larger data management systems. The idea of creating an index is to reduce large assemblies of data into an interpretable formula.
Rating	excellent

Additional Comments

Comments

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Technical Review #2

Comments	The project team has a distinguished record as does the expert panel. The team should be able to accomplish the task. No elements of infrastructure or support are missing.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget for this project is just under \$1,000,000. That appears to be a lot of money to develop a drinking water quality index. This project contains no data collection, no laboratory analysis, no equipment acquisition. Basically labor and travel. Seems like an index could be developed for a lot less. The hourly costs for the private sector personnel appear high. I note that the PI from University of Colorado bills at \$88/hour (\$73/hour plus 21% fringe benefits). Distinguished professors and an MD on the expert panel bill at \$150/hour. In contrast, two individuals from Brown and Caldwell bill at \$221/hour and an individual from Malcolm Pirnie bills at \$210/hour.
Rating	fair

Overall

Provide a brief explanation of your summary rating.

Comments	This project will likely produce a suitable product. That assessment is based on the qualifications of the project team. Little real thought has gone into this proposal. Review of existing indices is lacking and no idea of the form of the proposed index is provided. Costs are high.
Rating	good

Technical Review #3

proposal title: Development of Water Quality Indices: A Set of Qualitative and Quantitative Indicators

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The goals and objectives are clearly stated. There are no hypotheses associated with this proposal.
Rating	very good

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	First, I must admit that I have a negative bias towards such water quality indices. There have been a plethora of indices created for water quality in the USA and Europe. Most reveal little more than an individual, well trained in water quality and risk assessment, can glean intuitively from a visual examination of water quality data. An examination of IRIS or WET determined risk, combined with a review of nutrient and toxic substance make-up of a water body can often yield as good or better and more transparent interpretation of the state of the water system than a convoluted calculation of an index. Given the human firepower involved with the project, I am dissappointed in the goals and objectives of the project proposal.
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Technical Review #3

Rating	fair
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Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	The approach is certainly feasible, but little knowledge is to be gained from the effort and expense proposed for this project. The information might have some marginal use to decision makers, but as I suggested above, a good water quality specialist could arrive at a sound estimate of water related risk by examining the vast amount of data on the Bay that has been collected by EPA, USGS, the State of California and local entities, combined with existing risk calculation tools.
Rating	poor

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	The project certainly is feasible. The possibility of success depends on the definition of success. If success is the development of a tool that would be valuable to decision makers and contribute to our knowledge of estuarine systems, then I would not consider the successful execution of the project a successful contribution to California or science. This type of index calculation has been done since the 1970s. The authors are fully capable of executing this project. Much lesser scientific minds than this fine group
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Technical Review #3

	could also execute the project.
Rating	fair

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	Monitoring is not involved in the project. They will synthesize existing data.
Rating	not applicable

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	No new data will be generated. Existing data and tools will be synthesized into a water quality index. The deliverables seem to be final reports to stake holders and local governmental agencies. Few good peer-reviewed publications are likely to come out of the work.
Rating	poor

Additional Comments

Comments	I must reiterate that I have seen few or no water quality indices that could serve beyond a single system or generate a better understanding for decision making than could be done by looking at concentrations of selected materials in existing databases. Once developed for a particular water body, most WQI's will not work for other water bodies, so transfer capability is very limited.
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Technical Review #3

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The investigators, as well as the advisory board, are people of outstanding reputation, publishing records and capability. They have all that is needed to execute the project.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	I find the near \$1 million budget exorbitant for the deliverables proposed. In my judgment, the cost/benefit ratio is dismal.
Rating	poor

Overall

Provide a brief explanation of your summary rating.

Comments	I can see no fruitful addition to our scientific knowledge base from this work. The work is not innovative or creative, and offers little return for the dollar. It is a shame that such an excellent group of scientists and engineers would be wasted on a project of such limited value.
Rating	poor

